BTEC Assignment Brief

Qualification	Pearson International BTEC Level 3 Diploma in Engineering Pearson BTEC International Level 3 Diploma in Electrical/Electronic Engineering Pearson BTEC International Level 3 Diploma in Mechanical Engineering Pearson BTEC International Level 3 Diploma in Computer Engineering Pearson BTEC International Level 3 Extended Diploma in Engineering Pearson BTEC International Level 3 Extended Diploma in Electrical/Electronic Engineering Pearson BTEC International Level 3 Extended Diploma in Mechanical Engineering Pearson BTEC International Level 3 Extended Diploma in Computer Engineering
Unit number and title	**Unit 20: Analogue Electronic Circuits**
Learning aim(s)	**A:** Investigate through research and simulation the operation of single function analogue electronic circuits. **B:** Explore the operation of single function analogue electronic circuits safely that form the building blocks of commercial circuits.
Assignment title	1 Single function analogue circuits
Assessor	
Issue date	
Hand in deadline	

Vocational Scenario or Context	You have recently started an apprenticeship with a small engineering company that makes specialised electronic products. As part of your apprenticeship you need to provide evidence to your manager that you can identify commonly used single function analogue circuits, the components used to make them, how they are connected and how component values affect the circuit operation. Your manager has asked you to explore the relationship between the theoretical operation of the circuits, the results of simulation, and measurements taken on physical circuits.

Task 1	You have been asked to explore a range of single function analogue circuits by carrying out software simulation and constructing circuits to compare their theoretical and physical operation. **To do this**: Your tutor will provide you with a range of circuit diagrams for six different types of analogue circuit. You need to: a) Use a Computer Aided Design software package to capture and simulate at least two circuits for each of the analogue circuit types. o Power supply o Passive filters

	o Transistor amplifiers o Operational Amplifiers o Oscillators o Communications applications You should make sure that your diagrams are drawn to appropriate national or international standards. b) Use an appropriate prototyping method to construct each of the analogue electronic circuits in activity a) and take measurements to demonstrate the operation of each one (at least twelve circuits in total). c) Calculate theoretical measurements for each type of analogue circuit (at least twelve circuits in total) to demonstrate the relationship between component values and circuit parameters. **You should then:** Compare the results from your simulation, the physical circuit and theoretical calculation for each of the analogue circuits. You should use this comparison to evaluate the operation of each of the circuits, taking into account any differences between the results gathered from the physical circuits and those achieved theoretically or through simulations. Note: You may prefer to carry out the "investigate, simulate, build and test and write up" of each circuit before progressing to the next circuit.
Checklist of evidence required	A developmental log supported by observation and/or witness statements. The log should contain circuit diagrams, photographs, tables of results, sketches, waveforms, screen shots, calculations and an evaluation of the physical and simulated circuits.

Criteria covered by this task:	
Unit/Criteria reference	To achieve the criteria you must show that you are able to:
20/AB.D1	Evaluate, using language that is technically correct and of a high standard, the operation of at least two circuits from each type of analogue circuit, comparing the theoretical calculations and results from safely conducted experiments and simulations.
20/B.M1	Capture the circuit schematic and simulate accurately at least one circuit from each type of analogue circuit.
20/B.M2	Build at least one circuit from each type of analogue circuit and test the characteristics accurately.
20/B.M3	Analyse, using theoretical calculations and test results, the correct operation of at least one circuit from each type of analogue circuit.
20/A.P1	Capture the circuit schematic and simulate the correct operation of at least one circuit from each type of single function analogue circuit.
20/B.P2	Build one circuit from each type of single function analogue circuit safely and determine the characteristics of each.
20/B.P3	Explain, using theoretical calculations and test results, the correct operation of one circuit from each type of single function analogue circuit and suggest suitable applications.

Sources of information to support you with this Assignment	**Books** Electronics: A systems approach; Storey N; Prentice Hall (2013); ISBN-13: 978-0273773276 Practical Electronics for Inventors; Scherz P Monk S; McGraw-Hill Education TAB (2016); ISBN-13: 978-1259587542 Electronics; Sparkes JJ et al; Nelson Thornes Ltd (2003); ISBN 0 7487 7036 4 The Art of Electronics; Horowitz P, Hill W; Cambridge University Press (2015); ISBN-13: 978-0521809269 Learning the Art of Electronics: a hands-on lab course; Hayes TC, Horowitz P; Cambridge University Press (2016); ISBN-13: 978-0521177238 BTEC Nationals Engineering Student Book + Activebook: For the 2016 Specifications (BTEC Nationals Engineering 2016); Buckenham A et al; Pearson Education (2016); ISBN-13: 978-1292141008 **Websites** electronics-tutorials.ws **Above are some examples of websites. Further useful resources may be found at** qualifications.pearson.com/en/support/published-resources.html#step1